Theoretical Probability (or simply, Probability)

The probability of an event can be found if all outcomes are ***equally likely***.

$$P(E)=\frac{Number\ of\ \ favorable\ outcomes}{Total\ number\ of\ \ outcomes}$$

A **Favorable outcome** is the outcome that you expect if you did the activity.

Flip a coin -either a heads or a tails.
Roll a die -any number from 1 through 6
Pick a card from a deck of 52 -any card A, K, Q, J, 10 through 2.

The *number of favorable outcomes* is the number of times the outcome can occur.

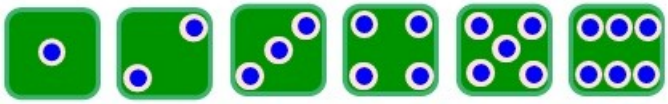
The **Event *(E)*** is the activity which there are *favorable outcomes*.

The **sample space** is all the possible outcomes in the probability activity.

Ex1. What is the probability of rolling a 5 on a die?

There are six possible outcomes

$$P(5)=\frac{1}{6}$$



This is the sample space for a single die.

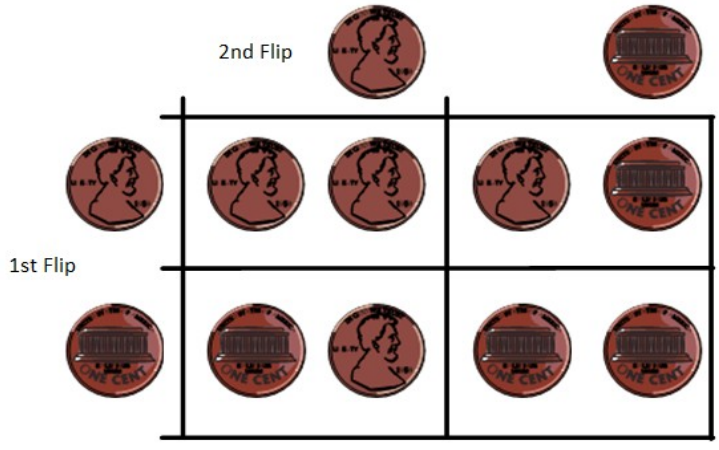
Ex2. What is the probability of rolling an odd number? $P(odd)=\frac{3}{6}$

Sample Space for flipping a coin: Heads or Tails (that's 2 possible outcomes!)

Sample space

for flipping two coins

(4 possible outcomes)



P(at least 1 tail) ?

Count them!